

Claims:

What is claimed is:

1. (amended) A method of catalytic reaction using a micro-reactor, characterized in that:

said method of catalytic reaction uses a micro-reactor with a metal catalyst or a metal complex catalyst as a solid phase supported on the inner wall of the channel, characterized in that

said metal catalyst or said metal complex catalyst is a catalyst incorporated in a polymer,

said catalyst incorporated in a polymer is supported on the inner wall of said channel by covalent bond of a group provided on the inner wall of said channel or in a spacer via a group of the polymer surface,

a gas as a gas phase is passed at the center part of the channel,

a solution as a liquid phase in which a reactant is dissolved is passed between said gas and said catalyst supported on the inner wall of said channel,

thereby the reaction of said solution and said gas is conducted by the three phase catalytic reaction of solid – liquid – gas phases accelerated by said metal catalyst or said metal complex catalyst.

2.

3. The method of catalytic reaction using a micro-reactor as set forth in claim 1, characterized in that said metal catalyst is palladium.

4. The method of catalytic reaction using a micro-reactor as set forth in claim 1, characterized in that said metal catalyst is either one of chromium, manganese, iron, cobalt, nickel, copper, molybdenum, ruthenium, rhodium, tungsten, osmium, iridium, and palladium.

5. The method of catalytic reaction using a micro-reactor as set forth in claim 1, characterized in that said metal complex catalyst is a palladium complex catalyst.

6. The method of catalytic reaction using a micro-reactor as set forth in claim 1, characterized in that said metal complex catalyst is a metal complex catalyst of either one of chromium,

manganese, iron, cobalt, nickel, copper, molybdenum, ruthenium, rhodium, tungsten, osmium, iridium, and palladium.

7. The method of catalytic reaction using a micro-reactor as set forth in claim 1, characterized in that said gas phase consists of hydrogen or carbon monoxide.

8. (amended) A method of catalytic reaction using a micro-reactor, characterized in that:

said method of catalytic reaction uses a micro-reactor with a metal catalyst or a metal complex catalyst as a solid phase supported on the inner wall of the channel, characterized in that

said metal catalyst or said metal complex catalyst is a catalyst incorporated in a polymer,

said catalyst incorporated in a polymer is supported on the inner wall of said channel by covalent bond of a group provided on the inner wall of said channel or in a spacer via a group of the polymer surface,

hydrogen as a gas phase is passed at the center part of the channel,

a solution as a liquid phase in which a reactant is dissolved is passed between said hydrogen and said catalyst supported on the inner wall of said channel,

thereby the reaction of said solution and said hydrogen is conducted by the three phase catalytic reaction of solid – liquid – gas phases accelerated by said metal catalyst or said metal complex catalyst.

9.

10. The method of catalytic reaction using a micro-reactor as set forth in claim 8, characterized in that said metal catalyst is palladium.

11. The method of catalytic reaction using a micro-reactor as

set forth in claim 8, characterized in that said metal catalyst is either one of chromium, manganese, iron, cobalt, nickel, copper, molybdenum, ruthenium, rhodium, tungsten, osmium, iridium, and palladium.

12. The method of catalytic reaction using a micro-reactor as

set forth in claim 8, characterized in that said metal complex catalyst is a palladium complex catalyst.

13. The method of catalytic reaction using a micro-reactor as set forth in claim 8, characterized in that said metal complex catalyst is a metal complex catalyst of either one of chromium, manganese, iron, cobalt, nickel, copper, molybdenum, ruthenium, rhodium, tungsten, osmium, iridium, and palladium.
tungsten, osmium, iridium, and palladium.

14. (added) The method of catalytic reaction using a micro-reactor as set forth in claim 1, characterized in that the surface of the inner wall of said channel has silanol groups, and said spacer is covalent bonded with said silanol group by Si-O-Si bond.

15. (added) The method of catalytic reaction using a micro-reactor as set forth in claim 1, characterized in that the group on said polymer surface is an epoxide group, and the group in said spacer is modified with a functional group bondable with an epoxide group.

16. (added) The method of catalytic reaction using a micro-reactor as set forth in claim 8, characterized in that the surface of the inner wall of said channel has silanol groups, and said spacer is covalent bonded with said silanol group by Si-O-Si bond.

17. (added) The method of catalytic reaction using a micro-reactor as set forth in claim 8, characterized in that the group on said polymer surface is an epoxide group, and the group in said spacer is modified with a functional group bondable with an epoxide group.